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ABSTRACT

Part of a series of curriculum guides dealing with industrial education in junior high schools, this guide provides three units to be used in a one semester course in grade 9 on the subjects of industrial crafts, home maintenance, and photography. Among the industrial crafts included are leathercraft, plexiglass, decoupage, woodcraft, whittling, metal enameling, metal and wire sculpture, and casting plastic. In the home maintenance area the student is exposed to hand and power tools, fasteners and hardware used in the home, common household repairs, home electricity, and plumbing. During the photography mini-course the student becomes acquainted with various photographic materials, equipment, and techniques by engaging in activities requiring camera and darkroom use. Each mini-course includes a list of its goals; learning activities which the student will perform to achieve the skill levels necessary to fulfill the goals; tools and materials needed; and suggested reference sources. Lecture and demonstration topics for the teacher's use are provided in the industrial crafts and home maintenance units. (ELG)

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INDUSTRIAL EDUCATION

Mini-Course Cluster - Grade 9: HOME MAINTENANCE-INDUSTRIAL CRAFTS-PHOTOGRAPHY

PROGRAM DESCRIPTION

The mini-course cluster of Home Maintenance, Industrial Crafts, and Photography is an elective course offered to all ninth grade boys and girls at each of the junior high schools. There are approximately 150 annually enrolled. Classes meet fifty minutes daily, five days a week for one semester. Upon completion of the course, each student receives $\frac{1}{2}$ credit towards high school graduation.

The mini-course cluster is exploratory in nature. The general areas of exploration are in the field of Home Maintenance, Industrial Crafts and Photography. In each of the areas the students will become acquainted with necessary knowledge, materials, tools, machines, processes, and skills. Upon completion of this course the students should acquire an appreciation of related vocational and avocational areas.

INDUSTRIAL CRAFTS

Program Description

Crafts is an elective course offered to all ninth grade boys and girls in the junior high schools. Classes meet fifty minutes daily, five days a week for six weeks. This course is one of the three courses comprising a semester unit in Industrial Education. The unit consists of Home Maintenance, Crafts and Photography.

Crafts at the ninth grade level is exploratory in nature. The students will become acquainted with various tools, materials, and techniques by engaging in activities regarding decoupage, casting resin and molds, plexiglas, whittling, wire and metal sculpture, enameling, leather, and woodcraft.

Goals

1. The students will have an understanding regarding the basic fundamentals of crafts.
2. Through teacher guided activity, the students will gain knowledge regarding the materials, tools, and techniques of various crafts.
3. Through student organized activities, the students will gain manipulative experiences to reinforce their understanding regarding the techniques and skills of crafts.
4. The students will develop an understanding that crafts could easily be done in the home as a leisure time activity.

5. Through design and construction of an ecology box, students will become acquainted with a variety of materials and processes pertaining to woodcraft.
6. Through carving and whittling, the students will develop an appreciation of an early hand wood process.
7. The student will develop and understanding of metal enameling.
8. The students will develop and appreciation of creative metal and wire sculpturing.
9. The students will develop an appreciation and knowledge of leathercraft.
10. The students will develop an appreciation and understanding of plastics.

DECOUPAGE

Suggested Lecture - Demonstration:

1. What is decoupage?
2. Materials needed
3. Tools needed
4. Selecting the object
5. Selecting the print
6. Preparing the object
7. Preparing the design
8. Application of design to object
9. Finishing the object

The above suggestions are only basic, the teacher may want to use a variety of other materials and methods.

Performance Objectives for Goals 1, 2, 3, 4.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given a piece of wood (size, kind, shape, depends on the student's design) and #220 abrasive paper	The student will sand the piece of wood	The piece of wood is sanded to teacher's standards.
2. Given a brush, stain, and rag	The student will stain the piece of wood	The piece of wood is stained to teacher's standards.
3. Given a brush, sealer, and #220 abrasive paper (white glue and water may be used as a sealer)	The student will brush the sealer on the board, wait till dry (30 minutes) sand, wipe clean & brush another coat of sealer on the object	The piece of wood is properly sealed.

REQUIREDSKILLSCRITERIA

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| 4. Given a paper design, scissors, and/or exacto knife | The student will cut, tear, and/or burn the edges of a print as desired. If the tearing & burning process is used, the back edges of the print should be sanded to a complete taper | The print is ready to be mounted. |
| 5. Given the print, finished wood block, glue, brush, paper towels, brayer | The student will glue the back of the print & apply it to the finished wood block. The brayer will be used to remove air and pockets. Dry. | The print is applied to the wood block neatly. |
| 6. Given the project, brush, and lacquer | The student will apply one coat of lacquer. Dry 24 hours. | The project has one coat of finish. |
| 7. Given the project, brush, lacquer, and #400 or wet sandpaper | The student will sand the project until smooth. Clean and apply another coat of lacquer. Dry 24 hours. | The project is prepared and a second coat of lacquer is applied. |

NOTE: The same process is used until the desired amount of finish and appearance is obtained.

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| 8. Given the project, #600 abrasive paper & #0000 steel wool, polishing cloth & wax | The student will wet sand the project, steel wool the project and wax it. | The project is completed to specifications. |
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TOOLS REQUIRED

Decoupage brayer 3"
Pure bristle brushes

MATERIALS NEEDED - 24 students per class

Soft or hard wood (The amount depends on selection of design).
1 qt. of white glue or decoupage sealer
Abrasive paper: 6 shts. #220
 6 shts. #400
 6 shts. #600
1 pkg. #0000 steel wool
1 gal. Hallmark Decoupage Finish (American Handicraft)
1 gal. lacquer thinner
1 lb. paste wax

REFERENCE: Decoupage for Beginners by Katherine Dunn

WOODCRAFT - Ecology Boxes

Teacher Suggestions:

1. Finished glass size will be 10" x 10"; a 10" x 12" piece is standard size therefore 2" excess must be trimmed off by either the instructor, student, or at the supplier.
2. The following materials must be pre-cut by the instructor:
 - a. 3/4" x 1 1/2" x 8' white pine with 1/2" x 1/2" rabbet
 - b. 1/2" x 11 1/2" standard masonite
 - c. 1/2" x 1/2" x 8' plywood dividers
3. Dried seeds must be brought in by students.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given graph paper, ruler, and pencil	Students will mark off an 11 1/2' x 11 1/2' area and draw divider design	Design must remain in marked off area.
2. Given 3/4" x 1 1/2" x 8' strip pre-cut 1/2" masonite, miter box & tri-square	Cut 4 frame pieces with 45° angles for sides of box. Rabbet goes on bottom back.	Sides should fit around the perimeter of pre-cut 1/2" piece of masonite.
3. Given 4 side pieces for frame, pony band miter clamp or picture frame clamp and glue	Assemble frame with rabbet edge down using glue. Wipe off excess glue when clamp is tightened.	So all miters fit tightly
4. Given assembled frame, 1/2" x 1/2" x 8' strip, miter box divider design drawing and pre-cut back	Place back in frame back (rabbet edge) and cut dividers using design, then placing them in the box to check fit	To student divider design specifications.
5. Given assembled frame, cut dividers, oil stain, brush, paint thinner and a rag	Stain the frame and all dividers to the desired color. Wipe off excess stain with the rag.	Until no bare wood is showing and color is uniform on all
6. Given the stained frame and dividers, glue, deft and a brush	Glue dividers in place on the masonite back according to original design. Then brush a coat of deft on the assembled back and frame.	Apply finish without missing any spots

REQUIREDSKILLSCRITERIA

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| 7. Given the completed frame and back with dividers, claw hammer and 3/4" #18 brads | Place back with dividers in the frame and nail in place using brads and a claw hammer | Use 4 nails along each side. |
| 8. Given a 10" x 10" piece of glass, assembled frame and back, 1/2" round moulding and miter box | Place glass on top of dividers in box and cut 4 pieces of 1/2" round moulding to hold glass in frame | Moulding should fit around the inside edges of the frame. |
| 9. Given 4 pieces of cut 1/2" round moulding, white paint and a brush | Paint all 4 pieces of moulding. When dry, apply a second coat of paint. | Finish should be free of runs. |
| 10. Given the assembled frame and back and an assortment of dried seeds | Arrange seeds within the confines of the dividers | According to student design |
| 11. Given 10" x 10" piece of glass painted 1/2" round moulding, claw hammer, & 3/4" #20 brads | Place glass in completed box over dividers, then place 4 pieces of 1/2" round moulding over glass and nail in place with 2 brads per side | So glass fits tightly inside ecology box |
| 12. Given completed ecology box, brass hook, ruler, drill, and 3/22" drill bit | Find center top of frame, drill pilot hole and screw brass hook in place | So brass hook is in the center of the frame |

TOOLS REQUIREDMATERIALS NEEDED - 24 students per class

- | | |
|-----------------------|---|
| Ruler | 24 pcs. 10" x 10" single strength glass |
| Miter box and saw | 12 pcs. 3/4" x 1 1/2" x 8' white pine |
| Tri-square | 24 pcs. 1/2" x 1 1/2" standard masonite |
| Pony band miter clamp | 12 pcs. 1/2" x 1/2" x 8' plywood GIS AC |
| Claw hammer | 1 box 3/4" #18 brads |
| Glass cutter | 1 box 3/4" #20 brads |
| Drill - hand | 12 pcs. 1/2" round moulding by 1/2" - 7' long |
| 3/22" drill bit | 1 qt. Latex semi-gloss enamel - white (for all classes) |
| | 4 qts. oil stain (for all classes) |
| | 24 shts. 12" x 18" 1/2" grid graph paper |
| | 24 brass picture hooks |
| | 1 gal. deft wood finish (for all classes) |

REFERENCES: Creating Picture Hutches #1 & #2 American Crafts Series;
Hazel Pearson Hardicrafts: Rosemead, California 91770, 1973

Make a Keepsake Hutch; Craft Course Publishers Inc.;
Rosemead California 1972

WHITTILING

Suggested Lecture - Demonstration:

1. Type of tools used in whittling
2. Kinds of wood used
3. Selection of design
4. Transfer of design
5. Cutting of desired shape
6. How to carve
7. Use of gouging tools
8. Finishing the object

NOTE: Beginning projects can be found in the following booklets & books:

1. Carving Animal Caricatures, by Elma Waltner.
2. Whittling is Easy, Boy Scouts of America, Published by X-acto Crescent Products Co.
3. Carving Projects, by Parma Art League.

Performance Objectives for Goals 1, 2, 3, 4, 6.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given a piece of wood 3/4" x 2" x 3" (sugar pine) & a paper pattern	The student will trace the design from the pattern on the piece of wood	The design is on the piece of wood.
2. Using the piece of wood with the design, coping saw and/or jig saw	The student will cut out the design, (flat) using a coping saw or a jig saw	The design is cut out
3. Using the wood cut-out sloyd knife and/or pocket knife, X-Acto knife	The student will follow directions and carve the wood cut-out into its proper shape	The project is completed.

TOOLS REQUIRED

#2 Sloyd knife or suitable knife for whittling

Wood engraving set
6 pc. (Brorhead Garret)
#233165

MATERIALS NEEDED - 24 students per class

1 pc. 3/4" x 2" x 6' sugar pine

REFERENCES: Carving Animal Caricatures by Elma Waltner.

Whittling is Easy by Leroy Pynn - X-Acto Crescent Products Co.

A booklet of reference material regarding wood carving can be obtained from the Industrial Education Department Chairman.

METAL ENAMELING

Suggested Lecture - Demonstration:

1. The purposes of metal enameling
2. What is enameling?
3. Materials used
4. Tools used
5. Objects that are enameled
6. The processes and methods used
7. The enameling industry

Below is listed a few project ideas that may be of some use in your selection:

- | | |
|------------------------|--------------|
| 1. small copper dishes | 5. trays |
| 2. cuff links | 6. bowls |
| 3. earrings | 7. ash trays |
| 4. pins | 8. pendants |

Performance Objectives for Goals 1, 2, 3, 4, 7.

REQUIRED

1. Given a $1\frac{1}{2}$ " x $1\frac{1}{2}$ " piece of 18 guage copper, snips, files, hammer, emery cloth, crocus cloth
2. Using the formed piece of copper and an acid (pickling solution)
3. Using the formed piece of copper, enamel adhesive, and a base color of opaque or transparent enamel

SKILLS

- The student will cut and form the piece of copper to his desired shape
- The student will clean the form in the pickling solution. Rinse under a cold water tap and dry
- The student applies the adhesive and the enamel to the copper form

CRITERIA

- The piece of metal is cut and formed as specified.
- The copper piece is cleaned and dry.
- Adhesive and enamel is applied

REQUIRED

4. Using the copper form, kiln, spatula, enameling rack

5. Using the copper form, emery cloth, crocus cloth, steel wool, pickling solution

SKILLS

The student will put his form into the kiln. The copper form will be removed when finished.

The student will clean the formed copper enameled piece

CRITERIA

The copper form is being fired

The piece of copper is enameled as specified

TOOLS REQUIRED

Snips

Hammer (planishing)

Files

Kiln

Spatula (Enameling)

Enameling rack

MATERIALS NEEDED - 24 students per class

$\frac{1}{2}$ sq. ft. 18 guage copper

3 shts. fine emery cloth

3 shts. crocus cloth

1 qt. acid (pickling solution)

1 pt. gum solution

2 oz. enameling oil

Enamels. (Color & kind could be selected by instructor.)

REFERENCES: Amaco Metal Enameling.

General Shop by Groweman & Feirer, Pub. McGraw Hill.

General Metals by Feirer, Pub. McGraw Hill

METAL AND WIRE SCULPTURE

Suggested Lecture - Demonstration:

1. What is metal and wire sculpture?
2. Kinds of materials used
3. Type of tools used
4. Type and kinds of jigs and forms used
5. Designing and building bending jigs and forms
6. Designing a project
7. Various methods of cutting metals
8. Various methods of fastening metals
9. Finishing methods and materials

Metal and wire sculpture lends itself to a variety of unique and interesting projects. Below is listed a few project ideas:

1. abstract designs
2. various bowls and trays
3. flowers
4. figurines (people, animals, birds, planes, automobiles, bikes, etc.)
5. jewelry
6. pictures
7. mobiles
8. table decorations
9. fruit baskets
10. wire portraits

Performance Objectives for Goals 1, 2, 3, 4, 8.

REQUIRED

1. Given a block of wood (3/4" x 4"), 3 6d finishing nails and a hammer
2. Given a piece of wire (1/16" - 1/8"), side cutting pliers

SKILLS

The student will hammer the nail in a pre-designed pattern

The student will bend the wire around the nails so it makes the desired form. The wire is lifted and cut.

CRITERIA

The student hammers the nail as specified

The student bends the wire to fit the form.

REQUIREDSKILLSCRITERIA

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|---|---|---|
| 3. Using the wire form, propane torch or soldering iron, solder, striker, soldering paste | The student solders the two ends of the wire together | To the teacher's specifications |
| 4. Given a dowel or pipe (3/4" - 1") C clamp, 1/16" - 1/8" wire, cutting pliers | The student will <u>wind</u> the wire around the pipe or dowel, forming wire spirals. The spirals will be removed from the dowel or pipe and cut into rings | The wire is formed and cut to specifications |
| 5. Using the wire rings, pliers, propane torch, striker, solder, soldering paste | The student will straighten the rings, solder the ends together, form a pattern and solder the rings together | The rings are soldered as specified. |
| 6. Given a 4" x 4" piece of tin plate or sheet metal, straight snips | The student cuts the 4" x 4" piece of metal into several pieces with the snips | The metal is cut as specified. |
| 7. Using the pieces of cut metal, propane torch or soldering iron, soldering paste, asbestos mat | The student will solder the pieces together, using his own desired pattern | The pieces are soldered as specified. |
| 8. Given 2 pieces of 1/16" wire - 8" long, pliers, side cutting pliers | The student will twist the two pieces of wire and form an object that is self-standing | The wire is formed to the teacher's specification |
| 9. Given 1/16" x 12" soft copper or brass wire, needle nose pliers, side cutting pliers and a smooth or rough uncut stone | The student will wrap the stone to produce an attractive appearance. The stone must be held securely | The stone is wrapped to teacher's specification |

TOOLS REQUIRED

Claw hammer
Side cutting pliers
Needle nose pliers
combination pliers
Propane torch
Soldering iron
Striker
Straight snips

MATERIALS NEEDED - 24 students per class

1 pc. of pine 3/4" x 8'
1 lb. finishing nails 6d
50 ft. 3/32 wire - medium hard steel
50 ft. 1/8 wire - " " "
50 ft. 1/16 wire - " " "
1 lb. 50/50 solder
1 can soldering paste
25 ft. 1/16 soft copper wire
3 sq. ft. tin plate

REFERENCES: Metal and Wire Sculpture by Elmer Gruber - Sterling Pub. Co.

Fun With Wire by Joseph Leeming - J. Lippincott Pub. Co.

LEATHERCRAFT

Suggested Lecture - Demonstration

1. Kinds of leather
2. The processing of leather
3. Enlarging designs
4. Cutting and trimming leather
5. Preparing leather for tooling and carving
6. Transferring a design
7. Leather tooling and modeling
8. Stamping and stippling a design
9. Carving
10. Fastening

Performance Objectives for Goals 1, 2, 3, 4, 9.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given a piece of 7-10 oz. strap leather, straight knife, straight edge	The student cuts the leather	The leather is cut as specified.
2. Using the piece of leather and a damp sponge	The student prepares the leather to transfer a design	The leather is prepared as specified.
3. Using the piece of leather, a paper design, a tracer modeler tool	The student transfers the design	The design is transferred as specified.
4. Using the leather piece and a modeling tool	The student tools the piece of leather	The leather is tooled as desired.
5. Using the same piece of leather and leather-craft kit	The student will carve, bevel shade, background, camouflage, and decorate the piece of leather	

NOTE: The above performance task depends largely on many facets of the project. The instructor must consider time and depth of instruction.

REQUIREDSKILLSCRITERIA

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| 6. Given two pieces of leather, rotary head punch, needle, awl, and snap-button outfit | The student fastens and assembles a snap-button | The snap-button is installed as specified. |
| 7. Given two pieces of leather, thonging chisels, dividers, a mallet, and a combination punch | The student will punch slits in the leather for lacing | The slits are punched for lacing |
| 8. Using the same piece of leather, lacing, and a lacing needle | The student will lace the pieces of leather together using the lay-over stitch | The two pieces of leather are laced as specified. |

TOOLS REQUIREDMATERIALS NEEDED - 24 students per class

Straight edge

Strap leather 7-10 oz.

Straight knife

1 spool lacing needles

Modeling tools

5 doz. snap buttons

Leathercraft tool kit

1 pt. leather dressing

Rotary punch

1 lb. wax

Awl

Mallet

Thonging chisels

Dividers

REFERENCE: Leathercraft by Fred Zimmerman - Goodheart, Wilcox Pub. Co.

PLEXIGLASS

Performance Objectives for Goals 1, 2, 3, 4, 10.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given a sheet of graph paper and a pencil	The students will design and draw an object that will be formed from plexiglass	Product cannot be larger than 6" x 6".
2. Given sugar pine, dowel rods, drill & bit, glue, nails, a claw hammer, and jig saw	The students will construct a mold to shape their piece of plexiglass	To student design and specification
3. Given an assembled mold, sand paper, shellac, a 1" brush, steel wool, paste wax, and a rag	Sand the completed mold and apply one coat of shellac. The following day, steel wool the mold and wax.	Eliminate all sharp edges and apply a smooth finish.
4. Given the proper size piece of 1/8" plexiglass, coping saw, file, sandpaper, and vice	Cut the plexiglass to the desired shape, file, and sand all edges	Until all edges are smooth
5. Given a smooth piece of plexiglass shaped to student specifications buffer and polishing compound	Students will buff all edges on the piece of plastic	Until all scratches are removed
6. Using the student constructed mold, the prepared piece of plexiglass, glove, and a plastic oven	Heat the plastic for one minute at 220°. Remove and shape by placing in the mold.	Until proper shape is attained
7. Given the shaped piece of plexiglass, rag, and plastic polish	Students will polish finished product by following instructions on the side of the can	Until product has a gloss

TOOLS REQUIRED

Drill
Drill bit
Claw hammer
Jig saw
Coping saw
File
Vice
Buffer
Plastic oven

MATERIALS NEEDED - 24 students per class

24 shts. $\frac{1}{4}$ " grid 8" x 10" graph paper
2 pcr. $\frac{3}{4}$ " x 8" x 8' sugar pine
1 pc. $\frac{1}{8}$ " x 2' x 3' plexiglass
10 shts. medium garnet paper
7 shts. fine garnet paper
1 pt. shellac
5 1" brushes
1 bar plastic polishing compound (for all classes)
Assortment of small finishing nails #3 & #4
1 can plastic polish (for all classes)
1 pkg. 000 steel wool
1 can paste wax (for all classes)

REFERENCE: General Plastics

CASTING PLASTIC

Performance Objectives for Goals 1, 2, 3, 4, 10.

REQUIRED

SKILLS

CRITERIA

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| 1. Given a sheet of graph | Students will draw the shape and size of their product | Product not to use more than 4 oz. of resin. |
| 2. Given a piece of tin plate, scribe, tin snips, pliers, and a vice (only for those students constructing a form) | Students will cut and shape metal to make their form | To student specifications |
| 3. Given either a student constructed mold or a manufactured mold, casting plastic, hardner, paper cups, mixing sticks, coloring, and wax paper | Students will mix proper amount of casting plastic and hardner in paper cup and fill form to proper level | As to instructions given by the instructor |
| 4. Given a form with hardened plastic, sandpaper, and smooth file | Students will remove product from mold, clean mold, sand and file edges of plastic | Until all surfaces and edges are smooth |
| 5. Given a sanded piece of casting plastic, buffer, and polishing compound | Buff all surfaces of plastic using the buffer and polishing compound | Until all surfaces are free of scratches and glossy |
| 6. Given a buffed piece of casting plastic, plastic polish, and a rag | Apply polish following written instructions on can and wipe off when dry. | Until all polish is removed and surfaces have a luster |

TOOLS REQUIRED

Scriber

Tin snips

Pliers

Vice

File

Buffer

MATERIALS NEEDED - 24 students per class

20 shts. $\frac{1}{4}$ " grid 8" x 10" graph paper

1 pc. 2' x 2' tin plate

1 gal. casting plastic

? hardner (proper quantity for hardening 1 gal.)

Assortment of coloring agents (for all classes)

24 5 oz. paper cups

24 stirring sticks (popsicle sticks)

1 roll wax paper

12 shts. 150 silicon carbide paper

1 bar plastic polishing compound (for all classes)

1 can plastic polish (for all classes)

HOME MAINTENANCE

Program Description

Home Maintenance is an elective course offered to all ninth grade boys and girls in the junior high schools. Classes meet fifty minutes daily, five days a week for six weeks. This course is one of three courses comprising a semester unit in Industrial Education. The unit consists of Home Maintenance, Crafts, and Photography.

Home Maintenance at the ninth grade level is basic and fundamental in nature. The students will become acquainted with various tools, materials, techniques and skills regarding hand and power tools, fasteners and hardware used in the home, interior repairs, home electricity, and plumbing.

Goals

1. The students will have an understanding regarding the basic fundamentals of maintenance.
2. The students will understand the proper techniques for hand tool use.
3. The students will gain knowledge regarding tools, materials, and processes used in home maintenance.
4. The students will gain knowledge in the proper method of hand power tool use.
5. The students will understand fasteners and hardware as it applies to the home.
6. The students will have an understanding regarding common interior household repairs.
7. The students will develop an understanding of basic home electricity.
8. The students will understand electrical terms and color codes.
9. The students will develop basic skills necessary to use specialized plumbing tools.

HOME MAINTENANCE - Unit I - Hand and Power Tools

Performance Objectives for Goals 1, 2, 3, 4.

REQUIRED

SKILLS

CRITERIA

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|--|---|--|
| 1. Given a hand brace, auger bit, C clamp, and a block of wood | Student inserts bit in brace, secures wood block, and drills a hole | Hole is centered in wood block with no burrs after drilling. |
|--|---|--|

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
2. Given a hand drill, twist drill bit, C clamp and a block of wood	Student inserts bit in drill, secures wood block, and drills a hole	Hole is centered in wood block with no burrs after drilling.
3. Given a coping saw block of wood, C clamp	Student draws an irregular curve on one edge of the block, secures block with clamp and cuts irregular shape with coping saw	Saw cut should follow line drawn
4. Given an irregular shaped piece of wood and files	Student rounds off the cut edges on the wood block	To eliminate all sharp edges
5. Given a wood block with rounded edges, a piece of medium and fine garnet paper	Student will hand sand all edges that have been rounded	Until all edges are very smooth
6. Given a wood block with the edges hand sanded and a finishing sander	Student will sand the wood surfaces	Until all surface marks are removed and surface is smooth
7. Given an electric hand drill, two twist drill bits, a vice, two blocks of wood, and a wood screw	Student inserts largest bit in drill, drills shank hole, removes bit and inserts smallest bit, drills pilot hole	Drilled holes large enough to prevent wood from cracking when screw is inserted

TOOLS REQUIRED

Hand brace
Auger bits
Drill bits (twist)
C clamps
Hand drill
Coping saw
Wood files
Finishing sander
Electric hand drill

MATERIALS NEEDED - 24 students per class

Softwood blocks (approximately 10 sq. ft.)
6 shts. medium abrasive paper
6 shts. fine abrasive paper
24 flathead wood screws

REFERENCE: Reader's Digest - Complete Do-It-Yourself Manual, pp. 10-66

HOME MAINTENANCE - Unit II - Fasteners and Hardware Used in the Home

Suggested Lecture - Demonstration:

1. Nails - Their kinds, uses, and application
2. Screws, washers, and screw hooks - Their kinds, uses, and application
3. Nuts and bolts - Their kinds, uses and application
4. Hinges, knobs and pulls, stops and holders - Their types, uses, and application
5. Miscellaneous hardware - window hardware, hasps, and staples, etc.- Their types and uses
6. Adhesives - Their types, uses and proper application

Performance Objectives for Goals 1, 2, 3, 5.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given a claw hammer, C clamp, ample blocks of wood, box and finishing nails, and a nail set	The students will nail the blocks together using each of the following methods: straight nailing, clinch nailing, toe nailing, dovetail nailing, and finish nailing	The final product must indicate that proper methods of nailing were used.
2. Given two blocks of wood, hand drill, 2 drill bits, countersink, flathead wood screws, awl, screwdriver	The student will locate and mark screw position, drill shank hole, countersink the hole, mark the position of the pilot hole, drill the pilot hole, and screw the blocks together	The two blocks of wood must be screwed together tightly.
3. Given a portable drill, masonry bit, masonry bolt and anchor, and a masonry block	Student locates and marks the position to be drilled. He will drill the hole at the specified depth and insert the anchor and bolt.	The anchor must fit flush and tight as the bolt is tightened.
4. Given a portable drill, masonry bit, 2 hole masonry block, toggle bolt, and a screwdriver	The student locates and marks the position to be drilled. He drills the hole through the block and fastens the toggle bolt	The toggle bolt must fit tightly.

REQUIRED

5. Given a hand drill, drill bit a piece of $\frac{1}{2}$ " drywall, a screwdriver and a molly bolt
6. Given a cabinet pull a block of wood, hand drill, drill bit rule, tri-square, and a screwdriver
7. Given six small blocks of wood ($1\frac{1}{2}$ " x $1\frac{1}{2}$ "), PVA adhesive (white glue), contact cement, epoxy, and brushes

SKILLS

- The student will locate and mark the position to be drilled. He will drill the hole through the drywall and fasten the molly bolt.
- The student will locate and mark the position of the holes to be drilled. He will drill the holes and fasten the cabinet pull.
- The student will attach three pairs of blocks together using PVA, contact, and epoxy glues.

CRITERIA

- The molly bolt must fit firm and tight.
- The holes must be located and drilled properly so the cabinet pull will be straight and tight.
- Each pair of blocks must be glued tightly.

TOOLS REQUIRED

Claw hammer
C clamps
Nail set
Hand drill
Drill bits (twist)
Awl
Screwdrivers
Electric drill
Masonry bit set ($\frac{1}{2}$ " - $\frac{1}{4}$ ")
Steel rule
Tri-square

MATERIALS NEEDED - 24 students per class

1 lb. 7d box nails
1 lb. 6d finish nails
24 $1\frac{1}{2}$ #8 wood screws flathead
24 masonry bolt and anchors
4 8" x 8" x 16 masonry blocks (two hole)
12 toggle bolts $\frac{1}{2}$ x 3
24 molly bolts $\frac{1}{2}$ "
1 sht. $\frac{1}{2}$ x 4 x 8 drywall
12 cabinet pulls
1 pt. white glue
1 6 oz. tube epoxy
1 qt. contact cement
Softwood blocks (approximately 5 sq. ft.)

REFERENCE: Reader's Digest - Complete Do-It-Yourself Manual, pp. 68-86

HOME MAINTENANCE - Unit III - Common Household Repairs

Suggested Lecture - Demonstration:

- | | |
|-------------------------------------|-----------------------------|
| 1. Wall and ceilings | 11. Wood sash storm windows |
| 2. Baseboards and moldings | 12. Screens |
| 3. Stairs | 13. Window shades |
| 4. Floors | 14. Venetian blinds |
| 5. Double-hung windows | 15. Drapery hardware |
| 6. Weatherstripping windows & doors | 16. Doors |
| 7. Wood sash windows | 17. Ceramic tile |
| 8. Casement windows | 18. Basements |
| 9. Horizontal sliding windows | 19. Household pests |
| 10. Awning and jalousie windows | |

Performance Objectives for Goals 1, 2, 3, 6.

REQUIRED

SKILLS

CRITERIA

- | | | |
|--|--|---|
| 1. Given a utility knife, a steel rule, 1 sheet $\frac{1}{2}$ " x 4' x 8' drywall | The student will lay out and properly mark the wall-board. He, using the utility knife, will cut the wallboard so that he will have one square foot. | The square foot of drywall should be square indicating proper layout and knife cut. |
| 2. Given a 2" x 4" x 12" piece of wood, 4 dry-wall nails, a hammer, joint compound, and a putty knife | The student will center and nail the drywall to the piece of wood. He will then apply a coat of joint compound on the dimpled hammered surface | The drywall centered, nailed, and a coat of joint compound smoothly applied. |
| 3. Given the same drywall project, sandpaper, joint compound, and a putty knife | The student will sand the dry area smooth and apply another coat of joint compound. When dry, sand smoothly. | The repaired area should be smooth. |
| 4. Using the same drywall project, plus 9 ceramic tiles, tile adhesive, putty knife, steel rule, grout, sponge, 1 gal. food can, water, and squeegee | The students working together as a team will apply adhesive to the tile and place them on one drywall project. They will mix the grout and apply grout to the tile. The grout should be sponged giving it a neat appearance. | The tile should be straight and tight. The grout should be neat with fine smooth lines. |

REQUIREDSKILLSCRITERIA

- | | | |
|---|---|--|
| 5. Using the drywall project plus a curved knife or any suitable sharp cutting tool, grout, 1 gal. good can, water, sponge, putty knife, and squeegee | Two students working together as a team will remove the hardened grout from the tile. They will regROUT the tile. | The grout should be removed clean and the regROUTING should be neat with fine lines. |
| 6. Given a chisel, mallet, and abrasive paper | Two students working together as a team will remove the tile and clean the tile for further use. | Careful removal of tile for non-breakage and adhesive needed. |
| 7. Given a window frame (a 6" x 12" frame) a piece of plastic (instead of glass), glaser points, putty, putty knife, screwdriver, hammer | Two students working together as a team will install the "glass" in the window frame using the glaser points and putty | The "glass" will be installed using the proper materials firmly and neatly. |
| 8. Given the same window frame and a putty knife | The students will remove the putty, glaser points, and plastic. The frame will be cleaned for a new installation. | The putty, glaser points, and plastic are to be removed neatly. |
| 9. Given the same window frame, one corner-iron type plate, 4 flathead screws, hand drill, drill bit, and a screwdriver | The student will properly locate and mark the location of the corner-iron screws. He will drill the pilot holes and fasten the plate to the frame | The corner-iron must be properly located and fastened. |
| 10. Given a 4" x 4" piece of screen with a 3/4" hole in the center, a 2" x 2" piece of screen, 1 utility knife, clear plastic cement | The student will use the 2" x 2" square of screen to repair the hole in the larger screen | The final product must indicate a good repair with neatness. |

TOOLS REQUIRED

Utility knife
Steel rule
Claw hammer
Putty knife
Curved linoleum knife
Mallet
Chisels
Hand drill
Screwdrivers
Drill bits (twist)
1 gal. empty food cans
Glaser's knife

MATERIALS NEEDED - 24 students per class

1 sht. $\frac{1}{2}$ " x 4' x 8' drywall
24 pcs. 2" x 4" x 12" fir
1 gal. drywall joint compound
6 shts. medium abrasive paper
12 sq. ft or 108 ceramic tiles 4" square
1 qt. tile adhesive
5 lbs. grout
1 box glaser points
12 corner-iron plates - $\frac{1}{8}$ " x 2" x 2"
100 $\frac{3}{4}$ #6 FH wood screws
1 tube 4 oz. plastic cement
6 sq. ft. window screen
12 6" x 12" frames
12 $\frac{1}{8}$ " x 4" x 12" plexiglass - clear

REFERENCE: Reader's Digest - Complete Do-It-Yourself Manual, pp. 90-160

HOME MAINTENANCE - Unit IV - Home Electricity

Suggested Ideas:

1. Students may replace cord from small appliance brought from home.
2. Students may make an extension cord for home use.
3. Design one lamp per class - novelty.

Performance Objectives for Goals 1, 2, 3, 6, 7.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given a 2 ft. piece of 14-2/w ground stranded cord wire, 3 prong plug, wire strippers, screwdriver, and a pair of needle nose pliers	Student will remove 1" of outer insulation, insert cord end with insulation through plug - securing with underwriters knot, strip off $\frac{1}{2}$ " of insulation off the end of each wire, bend loops on wire ends, and secure wires to terminals	All wires fastened securely and on proper terminals.
2. Given a VOM and toggle switch	Student will use VOM to test for continuity between terminals	To determine whether switch is good/bad
3. Given an electrical work board, toggle switch, duplex outlet, wire stripper, screwdriver, needle nose pliers, and 14-2 W/G Romex cable	Student will install switch and outlet to the work board	Without any shorts or poor connections
4. Given a lamp receptacle, electrical work board, wire stripper, screwdriver, needle nose pliers, solderless connector, and 14-2 W/G Romex cable	Student will install lamp to box to complete electrical system	Wires connected to proper terminals
5. Given a piece of $\frac{1}{2}$ " drywall (12" x 12"), new work box, compass saw, and hand drill with bit	Student will remove drywall by drilling holes and cutting	Without any spaces around the new work box

Each student will complete an extension cord. (Take home.)

TOOLS REQUIRED

Wire strippers

Needle nose pliers

Screwdriver

Electrical work board

Compass or saber saw

Volt/ohm meter

MATERIALS NEEDED - 24 students per class

50 ft. 14-2/w ground stranded cord wire

24 3 prong plugs

24 toggle switches - single pole

12 duplex outlets

50 ft. 14-2 W/G Romex cable

24 lamp receptacles/metal back with porcelain socket

3 doz. solderless connectors (14 ga. wire)

1 sht. $\frac{1}{2}$ x 4 x 8 drywall12 electrical outlet boxes/with hanging bracket ($3\frac{1}{2}$ ")REFERENCE: Reader's Digest - Complete Do-It-Yourself Manual, pp. 252-276

HOME MAINTENANCE - Unit V - Plumbing

Performance Objectives for Goals 1, 2, 3, 6, 9.

<u>REQUIRED</u>	<u>SKILLS</u>	<u>CRITERIA</u>
1. Given tape, adjustable crescent wrench or pipe wrench, screwdriver, stem washer and packing, (faucet-repair done on one of the lab sinks	Shut off water supply, wrap packing nut with tape, remove faucet handle, remove packing nut, replace stem washer (dripping faucet) or stem packing washer, if needed	Without damage to chrome finish or any faucet leaks
2. Given a clogged drain, a plunger, drain cleaner, adjustable crescent wrench or pipe wrench, tape, and a drain auger (sewer snake)	Students will seek the best method to unclog the drain starting with - a) plunger, b) drain cleaner, c) trap removal, d) drain auger until drain is clear of the obstruction	To open the clogged drain to enable water to flow freely
3. Given a piece of $\frac{1}{2}$ " copper tubing, two fittings, soldering paste, a striker, propane torch, solder, a damp rag, ruler, and tubing cutter	Students will solder the fittings and tubing together according to teacher specifications	According to specifications without any leaks
4. Given a piece of plastic pipe, ruler, plastic fittings, cement, brush, and hack saw	Students will cut, glue, and fit plastic pipe and fittings to specifications	Assembled according to drawing without any leaks
5. Given a faulty flush tank and an adjustable crescent wrench	Students will make the following adjustments: float position, washer replacement on inlet valve, linkage adjustment and repair of flush ball leakage	Make necessary adjustments

TOOLS REQUIRED

10" crescent or pipe wrench
Screwdriver
Auger sewer snake
Plunger
Propane torch
Tubing cutter
Steel rule
Hack saw
Striker

MATERIALS NEEDED - 24 students per class

1 sink faucet set
4 sets replaceable stem washers and packing unit
10 ft. 1/2" copper tubing
12 1/2" ell brass fittings
1 lb. 50/50 solder
1 can soldering paste
1 pkg. fine steel wool
10 ft. 3/4" plastic pipe
12 3/4" straight plastic fittings
1 can plastic pipe cement
12 1" pipe thread to 1/2" copper adapter
1 roll 3/4" masking tape 960 yds.)

Flush - 1 ballcock assembly

Tank -- 1 float and rod

Parts - 1 tank ball

REFERENCES: Reader's Digest - Do-It-Yourself Manual, pp. 212-248

Better Homes and Gardens - Handyman Book

PHOTOGRAPHY

Program Description

Photography is an elective course offered to all ninth grade boys and girls in the six junior high schools. Classes meet fifty minutes daily, five days a week for six weeks. This course is one of three courses comprising a semester unit in Industrial Education. The unit consists of Home Maintenance, Crafts, and Photography.

Photography at the ninth grade level is exploratory in nature. The students become acquainted with various photographic materials, equipment, and techniques by engaging in activities regarding camera use and darkroom procedures.

Major Goals:

Goal I: The students will have an understanding of light sources as applied to photography.

Objective 1 - Given examples of lighting situations, the students will distinguish between artificial and available light required for correct lighting exposure.

Objective 2 - Given examples of different types of artificial lighting, the students will choose appropriate lighting required for taking successful photographs.

Objective 3 - Given a variety of light sources from which to choose, the students will demonstrate their ability to achieve special effect lighting of subject.

Goal II. The students will develop a knowledge of physical composition and sizes of photographic film.

Objective 1 - Given a diagram of film, the students will correctly recognize all of the different layers that compose the film's make-up.

Objective 2 - Given a diagram of film, the students will correctly explain the purpose of each layer.

Objective 3 - Given an example of exposed undeveloped film, the students will correctly explain the reaction that causes a latent image.

Objective 4 - Given examples of various film sizes, the students will be able to compare and explain their unique differences specified by the film's manufacturer.

Goal III. The students will understand the basic characteristics (color sensitivity, speed, grain and contrast) of photographic film.

Objective 1 - Given examples of film sensitivity, the students will distinguish between blue sensitive, orthochromatic, and panchromatic film according to the manufacturers specifications.

Objective 2 - Given examples of film speed, the students will explain their effects on film according to the manufacturers specifications.

Objective 3 - Given examples of various photographs, the students will recognize the various degrees of graininess specified by the film's speed and emulsion.

Objective 4 - Given examples of both negatives and photographs, the students will distinguish the different tones of contrast.

Goal IV. The students will have a knowledge of different types of cameras.

Objective 1 - Given a fixed focus camera, the students will identify the capacities and limits specified by the manufacturer.

Objective 2 - Given a reflex camera, the students will identify the capacity and limits specified by the manufacturer.

Objective 3 - Given a rangefinder camera, the students will identify the capacity and limits specified by the manufacturer.

Objective 4 - Given a press camera, the students will identify the Capacity and limits specified by the manufacturer.

Goal V. The students will have a knowledge of photographic lens.

Objective 1 - Given a diagram of photographic lenses, the students will explain the reaction of lenses when random light hits the lens.

Objective 2 - Given a diagram of photographic lenses, the students will explain the meaning of its focal length specified by the teacher.

Objective 3 - Given examples of lenses with various focal lengths, the students will compare their uses and limits according to manufacturer's suggestions.

Goal VI. The students will have a knowledge of camera shutters.

Objective 1 - Given a camera with a leaf shutter, the students will identify and operate the shutter according to manufacturer's specifications.

Objective 2 - Given a camera with a focal plane shutter, the students will identify and operate the shutter according to manufacturer's specifications.

Goal VII. The students will have a knowledge of iris diaphragms or F/stops.

Objective 1 - Given an example of an iris diaphragm, the students will explain its principle and purposes specified by the teacher.

Objective 2 - Given a camera with a variable diaphragm, the students will manipulate F/stop settings to within $\frac{1}{2}$ F/stop for correct exposure.

Goal VIII. The students will have a knowledge of focusing devices.

Objective 1 - Given a rangefinder focusing camera, the students will correctly identify and operate it.

Objective 2 - Given a split-image focusing camera, the students will correctly identify and operate it.

Objective 3 - Given a superimposed focusing camera, the students will correctly identify and operate it.

Goal IX. The students will have a knowledge of exposure meters.

Objective 1 - Given a subject, available light, and a reflective light meter, the students will read the meter to within $\frac{1}{2}$ F/stop for a specified film and shutter speed.

Objective 2 - Given a subject, artificial light, and a reflective light meter, the students will read the meter to within $\frac{1}{2}$ F/stop for a specified film and shutter speed.

Objective 3 - Given a subject, available or artificial light, and a camera with a built in light meter, the students will manipulate the camera setting to within $\frac{1}{2}$ F/stop for a specific film and shutter speed.

Goal X. The students will demonstrate their ability to use a camera.

Objective 1 - Given a camera and available lighting, the students will correctly adjust all camera settings.

Objective 2 - Given a camera with an electric flash attachment, the students will correctly adjust all camera settings.

Objective 3 - Given a camera with a flash bulb attachment, the students will correctly adjust all camera settings.

Objective 4 - Given a camera and photo flood lighting, the students will correctly adjust all camera settings.

Goal XI. The students will understand the chemistry of film development.

Objective 1 - Given a list of photographic chemicals (developer, stop, fix, wash, hypo clearing agent, and photo flow solution), the students will correctly identify the chemicals.

Objective 2 - Given the various film developing chemicals, the students will explain the effects of each chemical on the film as specified by the teacher.

Goal XII. The students will demonstrate the ability to develop film.

Objective 1 - Given a practice roll of exposed film and a daylight developing tank, the students will correctly load the film into the developing tank.

Objective 2 - Given exposed rolled film developing tank and developing chemicals, the students will load the tank and develop the film according to the manufacturer's suggested procedure.

Objective 3 - Given exposed sheet film, developing trays and developing chemicals, the students will develop the film in total darkness according to the manufacturer's suggested procedure.

Objective 4 - During the developing procedure, the students will operate safely according to safety standards.

Goal XIII. The students will have a knowledge of the photographic paper's physical composition and sizes.

Objective 1 - Given a diagram of photographic paper, the students will correctly recognize all of the different layers that compose the paper's make-up.

Objective 2 - Given a diagram of the paper, the students will correctly explain the purpose of each layer.

Objective 3 - Given an example of exposed undeveloped paper, the students will correctly explain the reaction that causes a latent image.

Objective 4 - Given examples of various paper sizes, the students will be able to compare and explain their unique differences specified by the paper's manufacturer.

Goal XIV. The students will understand the basic characteristics of photographic paper.

Objective 1 - Given examples of photographic paper, the students will distinguish and explain the surface characteristics of texture, lustre, tint, contrast, and thickness specified by the manufacturer.

Objective 2 - Given examples of different paper sizes, the students will compare and explain their unique differences according to manufacturer's specifications.

Goal XV. The students will have an understanding of the chemistry of paper processing.

Objective 1 - Given a list of paper developing chemicals, the students will correctly identify the chemicals.

Objective 2 - Given the required paper developing chemicals, the students will explain the effects of each chemical on the paper specified by the teacher.

Goal XVI. The students will demonstrate the ability to produce a contact print.

Objective 1 - Given negative, contact printer, and contact paper, the students will expose and develop the paper to the manufacturer's suggested procedure.

Objective 2 - Given negatives, contact printer, and contact paper, the students will gang expose and develop the paper for proofing according to the manufacturer's suggested procedure.

Objective 3 - During the developing procedure, the students will operate safely according to safety standards.

Goal XVII. The students will demonstrate the ability to produce an enlargement print.

Objective 1 - Given a photographic enlarger, the students

will properly manipulate the various settings of the enlarger.

Objective 2 - Given an enlarger, test strip, negative and chemicals, the students will expose five different segments on the paper and develop according to suggested manufacturer's procedure.

Objective 3 - Given an enlarger, enlarging paper, negatives, and chemicals, the students will control exposure through cropping, dodging, spotting and/or vignetting and produce a print according to suggested manufacturer's procedure.

Objective 4 - Given a photographic print, the students will decide on and provide an appropriate print finish (matte, gloss, ferrotype) specified by the teacher's examples.

Goal XVIII. The students will understand photographic composition.

Objective 1 - Given a photographic subject to compose, the students will evaluate background control, tone balance, subject size, subject position, and camera position in comparison of photographic works of others.

Objective 2 - Given a camera and a subject to compose, the students will photograph the subject by applying composition criteria.

Goal XIX. The students will demonstrate the ability to recognize photographic subject matter.

Objective 1 - Given examples of photographic subject matter, the students will identify subject matter (scenes, people, architecture, animals, etc.) specified by photographic criteria.

Objective 2 - Given a camera and the assignment to take photographs, the students will select and photograph subject matter according to the esthetic values in photography.

Goal XX. The students will recognize the various career opportunities available to them in photography and related fields.

Objective 1 - The students will interact through discussion with a guest speaker on the topic of career exploration in photography.

Objective 2 - The students will participate in a project or field trip to explore career opportunities in photography.

Selected Activities in Photography:

All activities performed by the students will be aimed at meeting the objectives of the subject matter. As the instructor introduces and develops each objective, the students will acquire hands-on experience in producing photographs by utilizing suggested equipment and material. By reviewing the performance objectives, it will be noted that a great many photographic and darkroom procedures are performed by the students which are appropriate for introducing photography to ninth grade students.

Equipment List: meant to serve as a guide or check list. Instructor should exercise personal preference as to manufacturer or quality.

Brush, Staticmaster - 3" wide

Camera, 35mm - Honeywell Pentax Spotmatic - 1 50 mm normal lens each
1 105 mm lens and 1 135 mm lens
1 28 or 35 mm lens

Camera, Press - 2½ x 3½ minimum - Linhof - Graflex - Koni Omega

Camera Case, ... \$ 40.00

Changing Bags, Burke & James Zipper Film - Changing & Loading
25' x 24" \$ 15.95

Contact Printer, Brumberger Mdl. 1057 \$ 51.00

Darkroom Door (revolving), 2 way slimline for standard 36" doorway,
hinged for safety and quick exit (Space Saver-Class Control-
Material Saver) \$645.00

Developing Trays, Kodak Duraflex (6) 5" x 7" \$ 1.95
(6) 8" x 10" \$ 3.35
(4) 11" x 14" \$ 6.35
(1) 20" x 24" \$ 21.75

Enlarger, Beseler 45M Series price range \$500.00

Enlarger, Solar 45C - 150W bulb

Enlarging Easels, Airequipt - 4 way or Speed-Ez-Els
2½" x 3½" \$ 2.75
3½" x 5" \$ 3.35
4" x 5" \$ 3.45
5" x 7" \$ 4.35
8" x 10" \$ 5.75
11" x 14" \$ 7.50

Enlarger Lenses, (Many prices and qualities available.)

50MM Lens 24 x 36mm Negatives

75MM Lens 2½ x 2½ Negatives

135MM Lens 4 x 4 Negatives

Exposure Meters, Gossen (Pilot)

Gossen (Super Pilot Cos) \$ 48.16

Gossen (Luna Pro) \$ 76.58

Enlarger Negative Carriers, (Determined by enlarger.)

Ferrotypes Plates, (2) Chrome plated, stainless steel - (Sized to fit print dryer.) - 18" x 24" Technal . . . each . \$ 12.95

Film Cartridges, (For use with bulk film leader.)

Film Developing Tank, Roll - Kodacraft (2 sizes available)

16 oz. Aprons included \$ 4.95

Film Developing Tank, Roll - GAF 16 oz. Self Loading reel

Adjustable 35mm to 120 - Thermometer Stirring Rod. . . \$ 5.95

Film Dryer, Pako - Double Door - Cabinet - Thermostatic Control

120V-AC (Optional)

Film Holder, (Size to be determined by press camera.)

Film Loader, Bulk - Watson 100 daylight film . . . \$ 16.95

Filter Kit, Kodak Polycontrast - Model A. . . \$ 26.65

Flash, Electronic (Many units available) Features one might consider during selection: rechargeable batteries; disposable batteries; household current; automatic; hot shoe; synch. cord; light output-watt second rating - flash tube & reflector; angle of coverage; flash duration; shutter speed

Funnels, Polyethylene with stainless steel filters

16 oz. . . . \$ 2.25

32 oz. . . . \$ 2.95

Stainless steel - 1 pt. . . . \$ 8.05

1 qt. . . . \$ 12.50

Graduates, Polyethylene - Kodak .

8 oz. . . . \$ 1.75

16 oz. . . . \$ 2.15

32 oz. . . . \$ 2.65

Stainless steel - Leedal . 32 oz. . . . \$ 9.50

Press, Drymounting, Jumbo 150 - 18½" x 15½"

Print Dryer, Rexo 66 - 18" x 24", Canvas aprons, 2 sided thermostatic

control - 700 watts - 120 V-AC (Contact Prints & enlargements \$ 99.95

Printer, Proff - Technical - Prints all sizes of negatives up

to 8" x 10" . . . \$ 15.95

Print Roller, Premier Pro Type - Heavy duty rubber - nylon bearings

6" . . . \$ 2.45

8" . . . \$ 3.25

Print Tongs

Print Washer, Arkay Model 1114S - Type 316SS . . . \$ 25.75

DeHypo Turbulator . . . \$ 5.50

Kinderman 40 print model - 6" x 16" . . . \$ 19.95

Kodak Automatic Try - Siphon . . . \$ 10.75

Projection Print Scale, Kodak - Aid for enlargement - Exposure . \$ 2.65

Reflectors, Light - Clamp on for use with stands - Spun Aluminum

cord - switch - minimum 4

Safelights, NuArc DLB 1012 - 10" x 12" - wall mount

NuArc DLB 1325 - 13" x 25" - hang-wall mount

Sink, Darkroom developing - NuArc D42-4314 to accommodate 14" x 18"
trays - knockdown base 31" x 63" floor space - fiber glass
dump trough

Stands, Light - Smith - Victor Folding - minimum 3

Thermometer, Stainless steel housing

Timer, Darkroom - Gralab Model #300 - 1 sec. to 60 min. - luminous dial
750 W. capacity . . . \$ 39.50
Omega Audible repeating . . . \$ 45.25

Trimmer, Film and paper - Ingento 24" . . . \$ 55.00

Tripod, Camera . . . \$ 45.00

Ventilator, Darkroom - Exhaust fan - Advance - D42-1773 . \$ 42.95

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